

Application of a generalized difference expansion based reversible audio data hiding algorithm

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Abstract In this paper, a generalized difference expansion based reversible audio data hiding algorithm is proposed and a recommended application is introduced. The proposed algorithm is built on top of a recently proposed reversible image watermarking scheme. The main challenges to customize an image watermarking scheme to work for audio domain are the differences between the structures of image and audio, the target of the image watermarking scheme that based on is a two-dimensional 8-bit grayscale image and the target now is a one-dimensional 16-bit quantization audio waveform. The dimension issue can be solved by small modifications, while the difference between the sizes of image pixel and waveform sample is handled by the proposed intelligent partitioning algorithm, which partition the audio waveform into two portions, so that the image watermarking scheme based on can be applied to the audio. For the proposed algorithm, satisfactory amount of data can be hidden into the audio and the quality of the stego audio is acceptable. In average, a maximum embedding rate of 34,699 bits/sec can be achieved for the input audio, and in normal meta-data tagging and authentication embedding, SegSNR values around 30 dB can be obtained. With the proposed algorithm, the application recommended is useful in protecting audio copyright.

Keywords Audio · Steganography · Reversible watermarking · Data hiding · Waveform

1 Introduction

Reversible digital watermarking is a popular research topic in recent decades, which is a type of digital watermarking, a data hiding algorithm that embeds information into a digital signal, like audio, pictures or video, that can be used for authentication, attachment of ownership, and allows total recovery of the original signal without any distortion after the

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